AD/OCS

28 January 1970

MEMORANDUM FOR THE RECORD

SUBJECT: Digitization of U.S. Department of Agriculture Multispectral Scanner Data

1.   On 8 September 1969 a preliminary discussion was held with Mr. Thomas Kuhn of the Agriculture Research Service, Beltsville, Maryland. The purpose of this discussion was to determine whether the ANDI System could be utilized to digitize a 14-track analog tape containing Multispectral Infrared Scanner data. The tape was to contain multispectral imagery of selected agricultural sites in South Texas collected by means of a low flying aircraft manned by NASA personnel. Agency personnel present were

2.   The preliminary discussion with Mr. Kuhn left many questions, critical to the digitization effort, unanswered. A list of detailed questions was compiled and mailed to Mr. Kuhn. The reply was received on 25 September from Mr. Louis Brocato, Staff Specialist, Data Systems Application Division, Beltsville. Mr. Brocato's answers and several subsequent telephone inquiries provided sufficient information to initiate preprocessing of the multispectral scanner analog.

3.   The major concern was demodulation of the analog's 450 KHz wideband FM signal format present on each of the 14 tracks since only one quality FM discriminator is contained in the ANDI equipment complement. Fortunately an identical FM discriminator could be borrowed, and one of the TICOR discriminators could be reconfigured to demodulate one of the multispectral "sync" channels.

4.   Neither a time code nor a reference tone was available on the original analog. The time code would be mandatory if multiple digitizations were to be initiated at the same point on each track of the analog. The reference tone would be necessary to obtain a reproducible "system clock" from

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which digitization rates would be derived. Therefore a 1000 Hz IRIG time code and 100 KHz reference tone were recorded on two empty tracks, and all necessary parameters and equipment became available to the ANDI System for digitization to commence.

5. A digitization plan was formulated: a MOGEN program would be written to digitize two tracks at a time to a Model 2420 fast tape drive, twelve tracks would be digitized to six files on two fast tapes, only one minute of the fifteen minute overflight would be digitized to reduce the tremendous volume of data to a tolerable amount, the digitization rate would be 100 KHz during a 6 millisecond window within an 11 millisecond frame, and the window would be adjusted to contain one multispectral scan. Decommutation and sorting of the ANDI data would be accomplished via a series of overnight runs since the anticipated CPU time, core storage, and direct access storage requirements would be large.

6. After several false starts, the digitization was completed on 13 December 1969. One full minute of twelve separate data tracks was digitized as planned; the volume of data generated equalled nearly 60 million bytes.

7. Two FORTRAN programs were written to decommutate and temporarily store the scanner data and finally merge the data into the format requested by the USDA. The first, named SCANNER, separated the two data tracks contained in each of the six ANDI files into three files on four output tapes. At this point, each of the twelve digitized scanner tracks were contained in separate files of the four intermediate output tapes. The second program was named SCAN2, and its purpose was to read the intermediate output tapes onto system disk storage and then merge the scanner data, sample-for-sample, onto the final output tape. The task was completed on 15 December 1969 and the output tapes were delivered to the USDA for their analysis. As of 26 January 1970 no feedback had been received from the USDA concerning the results of their processing of the ANDI created data.

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Signal Analysis Branch
Scientific Applications Division

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